
MEASUREMENTS OF LEAKAGE NEUTRON SPECTRA FROM THICK SPHERICAL SHELLS OF VANADIUM AND LEAD WITH 14 MeV NEUTRONS AND VALIDATION OF THEIR NUCLEAR DATA

Boris V. Zhuravlev, Anatoliy I. Blokhin, Mikhail G. Kobozev, Vladimir A. Talalaev

State Scientific Center of Russian Federation - Institute for Physics and Power Engineering, 249030 Obninsk, Kaluga Region, Russia

The leakage neutron spectra from spheres of vanadium and lead with T(d,n) neutron source at their center have been measured by the time-of-flight method from 100 keV up to 14 MeV. The wall thicknesses of vanadium and lead spheres were 155 mm and 227 mm, respectively. The experiment was performed at the pulsed neutron generator KG-03 of IPPE [1]. The neutrons leaking from the outer surface of a spherical samples were detected with a scintillation counter composed of a paraterphenyl crystal of 5 cm in diameter and 5 cm long and FEU-143 photomultiplier tube. The detector was located at 6.8 m flight path from center of the sphere and was installed in lead house behind a 1 m thick concrete wall. For monitoring of the neutron source yield the alpha-particles produced in the T(d,n)He reaction were detected by a silicon surface barrier detector. The measured data were compared with the MCNP-4 code calculations with nuclear data libraries processed from ENDF/B-6, BROND-2m, EFF-3, FENDL-2. The results of comparison by the spectrum shape and the calculation/experiment values in nine energy groups are presented and discussed.

1. S.P.Simakov, B.V.Devkin et al. Report INDC (CCP)-417, Vienna, 1998.